

Utah Department of Transportation

Maintenance Management Quality Assurance Plus

MMQA+

Inspection Manual

July 2012



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Introduction

Over the past few years, several changes have impacted the way we manage our maintenance program. Most notably, the introduction of the Transportation Technician program and the launching of our new Operations Management System (OMS). These changes have brought about the opportunity to reevaluate the way we do business, with an emphasis on efficiency and accountability.

In the fall of 2011, UDOT established a Quality Improvement Team (QIT) to establish new target grades for maintenance MMQA grades in the 2013 fiscal year. This group also felt it was important to evaluate the need and frequency for all measurements. The QIT was made up of Region Directors, District Engineers, Area Supervisors and Station Foremen. The group determined that enough changes were needed to justify rewriting the manual to effectively implement these changes.

As a result of the QIT's recommendations, a new MMQA Panel was formed to review all activities and integrate the changes recommended by the QIT. The Panel was composed of District Engineers, Area Supervisors, Station Supervisors, Maintenance Analysts and Central Maintenance staff.

The Panel was split into groups to review the recommendations of the QIT and rewrite individual sections of the MMQA manual. Each section was then presented to the entire Panel and discussed at length, until the panel felt it accurately represented the recommendations of the QIT and the way we do business.

Things to come:

This updated manual is only the first of several changes that are coming to maintenance. As we go forward, the upcoming year will see other improvements that will help us increase our efficient use of employees and improve our accountability.

The department has initiated a contract to collect a complete feature inventory dataset, and another group is planning the development of Region MMQA data collection teams. Along with improved mobile technology, these changes will help UDOT maintenance continue to provide accountability, efficiency and effectiveness as we move forward into a new era of highway maintenance in Utah.

Finally, I would like to thank all those involved in the QIT and MMQA panel process. Their work and input has shaped the way we will continue to maintain our highway system. I would also like to personally acknowledge all of our maintenance employees. Your professionalism, ownership, innovation and dedication are some of the Department's most valuable assets. Because of your input and willingness to implement new ideas, UDOT maintenance has been, and continues to be, one of the premier highway maintenance organizations in the country.

Kevin Griffin
Director of Maintenance
Summer 2012

History

In 1997, the Utah Department of Transportation (the Department) developed and implemented the Maintenance Management Quality Assurance (MMQA) program statewide for the purpose of evaluating and reporting the effectiveness of its maintenance program. In 2003, the Department modified the program, and changed its name to Maintenance Management Quality Assurance Plus (MMQA+) based on the following considerations:

1. PEQIT report stated: "... (MMQA) program should be further developed to provide guidance for feature condition thresholds that would trigger maintenance response..."
2. Budgeting for the maintenance program previously was an incremental process, based on historical expenditures, plus a small increase for inflation. The Department needed a better tool to project and allocate funding, also a tool to communicate with our key customers, including the Legislature, Transportation Commission, Senior Leaders of the Department, and program users.
3. The Department needed a program to measure the Level of Maintenance (LOM) for our highway system.

Most recently, in 2011 Department Senior Leadership commissioned a Quality Improvement Team to review the MMQA program, and 1) establish appropriate MMQA target grades based on safety and mobility of the traveling public, public demand for a level of service, preservation of the infrastructure, and cost to the agency and to the taxpayer; and 2) reinforce the importance of MMQA measures for a) managing station, area, region, and statewide budgets and manpower resources, b) establishing annual budgets through the Zero-Based-Budgeting process, and c) reporting our accomplishments and level of maintenance to the public and political leaders. That QIT, upon completing its work, directed a new team to implement its recommendations and make appropriate changes to this manual consistent with those recommendations.

New for the July 2012 Revision

The recommendations of the 2011 QIT included some fundamental changes to the MMQA program. Those that impact our processes the most include:

1. **No more bimonthly measures.** With a couple of exceptions, all measures will now be semiannual. The exceptions are Snow and Ice, which is measured by the event, and Rest Area Maintenance, which remains a monthly measure because the rest area maintenance contract requires it. However, even though only semiannual measures are required, everyone is encouraged to record more frequent measures, particularly before and after significant work is done. Doing so will enable users to monitor trends more easily, making the MMQA program more useful for managing their work load.
2. **No more measures for Mowing, or for Traffic Island Maintenance.** The QIT determined that because UDOT practice is to mow one time per year rather than in response to vegetation height, rating our mowing for MMQA would not be very useful. In the case of Traffic Island Maintenance, the QIT determined that because only a small amount of money spent on this activity, devoting effort to an MMQA measure wasn't warranted.
3. **Litter now a matrix condition.** Litter will now be evaluated much like snow removal, on a 1 to 5 scale. This is meant to simplify rating our performance relative to litter removal. Also, instead of rating five 1/10 mile sections within the station boundary, one section (1/10 mile) per MMQA segment will be measured.
4. **Pavement striping will no longer be evaluated by the stations.** Instead, the measure will be based on retroreflectivity, as measured by a mobile device. The measurements, at least initially, will be done by Central Maintenance using a van procured for that purpose. The MMQA rating, therefore, will be based on nighttime visibility of the lines.

5. **Changes in Snow Removal reporting and grade calculation.** In an effort to simplify the reporting process, the reporting of materials quantities as part of the MMQA data entry process has been eliminated. However, MMQA will now calculate and report the grade for Snow Removal in two ways instead of just one. Besides a grade based on the condition one hour after the end of the storm, a grade will also be calculated and reported based on the condition during the storm. For this reason, it will be important to record the condition during the storm at any time the condition changes.
6. **Sweeping.** In some areas, mainly rural areas, roads tend to be essentially self-cleaning and therefore do not require much sweeping effort. MMQA, therefore, is changed in that now, “sweeping areas” will be defined, and will become the basis for the feature total.
7. **Fencing.** The measurement and reporting of fence condition is changed in recognition that some fences serve a higher safety purpose than others. As such, for the purposes of MMQA, individual runs of fence are classified as either “access control fence”, or “right-of-way delineation fence”.
8. **Vegetation Obstruction.** The method of calculation is changed, to be a ratio of obstructed signs to the total number of signs.
9. **Stricter grading scale for safety sensitive measures.** Recognizing that some measures are more safety sensitive than others, a new grading scale has been introduced for those measures. The new scale essentially squeezes the grading scale such that a grade in the “A” range is achieved when 95% of features are in acceptable condition (rather than 90%), and so forth (ranges of 5% instead of 10%). The measures affected include Shoulder Work, Vegetation Obstruction, Repair and Replace Signs, and Repair and Replace Delineation.
10. **Preferred timing of semiannual measures.** A statement has been added to encourage the semiannual measures to be collected in the months of April or May for the spring measures, and in September or October for the fall measures.

This new edition also includes clarified text to eliminate some ambiguities that may have previously existed, and more and larger pictures as examples of the desired and deficient conditions.

Purposes of the MMQA+ Program

MMQA+ has purposes at the statewide level, at the region or area level, and at the station level. At the statewide level, MMQA+ is used to communicate how well we are “Preserving the Infrastructure,” which is UDOT’s highest priority strategic goal, to our key customers – the Legislature, Transportation Commission, Department Senior Leaders, and program users. It is also used at the statewide level as a tool in the budget development process, and to show where more resources could be valuable or where resources could be reduced. Reports from MMQA+ are also used at the statewide level to help establish targets for future levels of maintenance in consideration of available budget and resources.

At the station level, MMQA+ is used to prioritize and schedule work activities. Station personnel can review MMQA+ reports to determine which activities in their station should receive either more focus or less focus given current conditions, established targets, and available budgets. Station supervisors can also compare budgets to current conditions, and request that money be moved from one activity to another to best meet MMQA+ targets. At the region or area level, purposes include both those described at the statewide level and those described at the station level. MMQA+ information is used at the region or area level to both report levels of maintenance achieved, and to manage resources and budgets to meet targets.

How MMQA+ Works

Maintenance performance is measured and reported in terms of a Level of Maintenance (LOM), expressed as a letter grade A, B, C, D, or F. At the statewide level, a target LOM (A through C) is established for each of the MMQA+ activities. Each maintenance station divides each of its routes into one or more segments. Following the guidelines in this manual, station personnel conduct inspections of each route segment, and record both the total number of features to be maintained within the activity subgroup on the segment, and the total number of deficient features. The inspection data are entered into the MMQA+ software (part of OMS), which calculates a LOM (A through F). Once the data are entered, the software can be used to print reports that help maintenance managers at all levels to effectively manage the resources at their disposal.

A Word about Targets

As used within the MMQA+ system, a target is not meant to imply a condition that must be met. Once a target LOM is established, the goal is to meet that LOM as closely as possible, neither falling short of the target nor exceeding it. A target for a particular maintenance activity is determined by taking into account the Department's strategic goals, the current level of maintenance (LOM) for that activity, the available budget, available resources such as labor, equipment, and materials, input from the public in the form of customer survey results, and input from District Engineers and other Department leaders. For safety-sensitive activities, the target LOM is generally set at "A". At all levels (statewide, region, or station), resources should be managed such that they are diverted toward activities that are falling short of their targets, and away from activities whose targets are being exceeded.

Quality Assurance for the MMQA+ Process

In order to maximize accuracy of MMQA+ measures and to promote consistency in measurement from station to station statewide, a quality assurance (QA) process has been instituted for the MMQA+ program. In this process, each station has a QA check done once every year. QA visits are scheduled such that 40 audits are conducted each spring, and the remaining 40 each fall. In both seasons, QA inspections are spread geographically around the state.

The QA process works like this. The QA coordinator from Central Maintenance creates a list of stations to receive audits during the QA inspection season. Having selected a station for an audit, he/she uses a statistically valid process to select a route segment for auditing. He/she then uses a statistically valid process to select between five and ten MMQA measures to audit. The QA team, which consists of one or two persons from Central Maintenance, then runs the MMQA LOM Inspections Report for the station, for comparison with the audit results. The QA team then conducts an inspection on the route selected, and for the measures selected, and compares the results to those obtained by station personnel. After the audit inspection, the QA team meets with the station supervisor to review the results with him or her and any other station personnel who are able to attend. This meeting can also be used as a training opportunity for station personnel. As a final step, the QA team prepares a report for the Area Supervisor, with copies to the District Engineer and the Analyst. The report includes a statistical measure of how closely the QA inspection matched the inspection done by the station.

The QA process is not meant to be a means for criticism or fault finding. It is, rather, an opportunity for training people's eyes so they see things more closely to the same way. It is required only because of the subjective nature of the measures being taken. Because different people see things differently, there is a need for us to "calibrate our eyeballs", so to speak, so that we maximize consistency in reporting statewide.

The Purpose of this Manual

In order for all the purposes of the MMQA+ program to be successful, we need to get high quality data. It is important that all route owners measure activities consistently and record measurements accurately. Therefore, we need your help to measure and record activities in accordance with this manual. There is always room to improve this program, so please feel free to contact your region/district MMQA+ representatives (District Engineers and Analysts) or the Central Maintenance Staff to make your comments and suggestions.

How to use this Manual

There is a section in the manual for each MMQA+ measurement that route owners are expected to take. They appear in the manual by order of group and subgroup. Generally for each measurement, there is listed a Description, the Desired Condition, and the Deficient Condition, followed by Reporting Guidelines, including Measurement Frequency, the Measurement Area, and reporting guidelines for the Deficiency and the Total. Sections are also included for Comments and Examples. Read on for further detail.

Description:	Describes what is to be measured.
Desired Condition:	This is the condition where an individual feature is considered to be “not deficient” for purposes of MMQA+ reporting. This is not to be construed as a condition to which every individual feature should be maintained. Instead, MMQA+ is designed to trigger maintenance response when a certain percentage of the total number of features falls below this condition.
Deficient Condition:	This is the condition where an individual feature is considered to be “deficient” for purposes of MMQA+ reporting.
Reporting Guidelines:	
Frequency:	This tells how often the measurement should be taken.
Measurement Area:	This describes the scope and extent of what should be looked at and measured.
Deficiency:	This tells how to record the count of deficient items, including measurement units.
Total:	This tells how to record the total count of features.
Comments:	A section for any additional information that may be needed to clarify any potential misinterpretations.
Examples:	This section includes pictures of roadway features in various condition states.

Individual route owners should use this manual in two ways. First, before going into the field, they should make themselves familiar with the procedures and methodologies described in each of the sections. Any general questions should be directed to either the station supervisor, area supervisor, District Engineer, or Analyst for clarification. Second, they should carry the manual with them in the field while performing MMQA+ inspections as a reference for anything they may have a question about. Both the descriptions and the pictures in the manual should serve to help anyone confidently describe the condition of any particular feature.

Updates to the Manual

This manual is always subject to review and revision. We can all benefit by constantly reviewing the manual and identifying places where improvements can be made. Central Maintenance will make updates from time to time, ideally with the input of each and every individual user of the manual. As revisions are made, it is the commitment of Central Maintenance to have those revisions immediately posted to the MMQA section of the UDOT Innerweb Maintenance page (<https://innerdot.udot.org/index.php?m=c&tid=212>). Please check back there often to be sure you always have the most up-to-date version of the manual.

Measuring Groups

Measurement Frequency

By Event

Remember to record road condition at the beginning of plowing operations, each time the condition changes, and one hour after precipitation ceases.

- 1A1 – Snow and Ice

Monthly Measurement

Record the results at least once monthly, between the 1st and 31st of the month. At the discretion of the supervisor or route owner, additional measurements may be taken to monitor trends and to properly manage work and budgets.

- 10A1 - Rest Area

Semiannual Measurements

Measure at least once between July 1st and December 31st and again between January 1st and June 30th, prior to performing significant work on the item. **When significant work is performed, record the resulting condition accurately in the system.** At the discretion of the supervisor or route owner, additional measurements may be taken to monitor trends and to properly manage work and budgets. It is not necessary that all measurements for all semiannual categories be completed at the same time, but each category should be measured at approximately the same time each year. Preferably, the spring measures should be taken in April or May, and the fall measures in September or October

- 3A1 - Shoulder Work
- 3A2 – Curb and Gutter
- 4A1 - Litter Pickup (one 1/10-mile section per MMQA segment)
- 4A2 – Fence Maintenance
- 5A1 – Weed Control (ten 1/10-mile sections)
- 5A2 – Control of Vegetation Obstruction
- 6A1 - Grade & Clean Ditches
- 6A2 – Maintain Inlets/Outlets
- 6B1 - Erosion Repair
- 8A2 - Pavement Messages
- 8A3 – Repair & Replace Signs
- 8A4 – Repair & Replace Delineators
- 8A5 – Guardrail Maintenance
- 8A8 – Sweeping

Group 1 – Snow and Ice

1A1 – Snow and Ice

Description:	A measure of the condition of the traveled roadway, starting when plowing operations begin, and continuing during and after adverse weather, until one hour after the storm ceases. For comparison purposes, a performance measure must be taken one hour after precipitation ceases in the vicinity. Measurement is intended to obtain conditions over roadways in general, and not by functional class.
Desired Condition:	Standards for snow removal are based on route category according to UDOT Policy 06A-42, by defined priority for each route section. Station snow plans and resources should correspond to the intended service level, as stated in the policy. The designated level of maintenance in MMQA+ is intended to correspond to UDOT policy when collective performance is examined relative to UDOT snow removal efforts.
Deficient Condition:	Observed roadway conditions are less than level of service established by policy 06A-42.

Reporting Guidelines:

Frequency:	By event. Record conditions when plowing operations begin, and thereafter when changes in road condition are observed during snow and ice removal operations, and at a point in time one hour after the storm ends. Records are to be entered into the OMS computer database as soon as practical.
Measurement Area:	All state routes, recording the worst condition on the plow route.
Plow Route:	The designated plow route, as defined by the region snow plan. Plow routes may include a portion of a state route, or multiple routes. A separate report is required for each plow route. If the system description of a route is not accurate, contact the District Engineer to make the change in OMS. Occasional deviations based on conditions and available resources are expected.
Time:	The hour of the day when the road condition was recorded. Condition is recorded a) when plowing operations begin, b) when the road condition changes during the storm, and c) one hour after precipitation ceases.
Trucks Plowing:	Enter the number of trucks performing snow removal operations. When other equipment, i.e. a grader, is involved in the traveled roadway snow removal effort, count each piece of equipment as a truck.
Pretreat:	Check this box for the hour liquid chemicals were applied to the road. (Pretreat is not required to be entered into OMS snow form).

Road Condition: Report the worst observed conditions, per plow route, according to the condition descriptions below:

Condition 1

Bare pavement conditions exist, (wet or dry pavement). A traveler will not experience delays as a result of weather-related pavement surface condition.

Recording Options:

- 1-W Wet

Condition 2

A motorist will encounter occasional snow build-up and may experience minor delays as a result of black ice, slush, or packed snow.

Recording Options:

- 2-IC Icy in some locations
- 2-SL Slushy in some locations, less than 2 inches deep
- 2-SN Snow-packed in some locations

Condition 3

A motorist will encounter widespread black ice and packed snow with only one wheel-track bare. The motorist will experience some delay as a result of weather-related pavement surface condition.

- 3-BL Black Ice
- 3-IC Icy
- 3-SL Heavy Slush greater than 2 inches deep

Condition 4

Snow build-up exists on the roadway. Slow travel and delays occur for the motorists.

- 4-SN Snow-packed

Condition 5

Due to significant amounts of snow, the road is impassable and temporarily closed. (Does not apply to seasonal road closures).

- 5-RC Road Closed

1 HR After Storm: Check this box to record the conditions for the designated comparison time point with all available information. This refers to a point one hour after the precipitation ceases, although snow removal operations may still be underway, and drifting may still be occurring. (Check box).

Comments: It is important to record conditions both throughout the storm (at the commencement of plowing operations and whenever conditions change thereafter) and at one hour after the storm, because OMS uses the observations to calculate MMQA grades for both during the storm and for one hour after the storm.

Examples:

Condition 1-W
(Wet Pavement)



Condition 2-SL
(Slushy in places, less than two inches deep.)



Condition 3-SL
(Heavy slush greater than two inches deep)



Condition 4-SN
(Snow-packed)



Condition 5-RC
(Road Closed)



Group 3 - Non-Hard Surface Maintenance

3A1 – Shoulder Work

Description:	A measurement of the vertical drop where the paved surface meets the gravel shoulder.
Desired Condition:	No edge rut, vertical drop-off or grade separation is greater than 1.5 inches.
Deficient Condition:	A hard surface shoulder, concrete or asphalt, which displays a vertical drop greater than 1.5" where the road meets the gravel shoulder.

Reporting Guidelines:

Frequency:	Semiannual
Measurement Area:	Measure the length of all gravel shoulders along all roadways.
Deficiency:	Report the total linear feet of vertical grade separation exceeding 1.5". Measure all instances of edge drop-off, no matter how short.
Total:	Report the total length of the gravel shoulder within the reporting section, including ramps, i.e. a standard divided interstate section with a depressed median, but no ramps, would have a total equal to four times the length of the section.
Comments:	All measurements are parallel to the centerline. This is a safety-sensitive activity and as such resources should be managed to mitigate any safety concerns.

Examples:

Desired Condition

(No edge-rut greater than 1.5 inches).



Deficient Condition

(Drop-off greater than 1.5 inches).



3A2 – Curb and Gutter

Description:	A measure of the functional condition of curbs and gutters, (concrete or asphalt), on state routes.
Desired Condition:	Curb is intact and allows for proper drainage.
Deficient Condition:	Curb does not allow for proper drainage due to upheaval, misalignment, broken or severely cracked sections.

Reporting Guidelines:

Frequency:	Semiannual
Measurement Area:	All UDOT-maintained roadways / roadsides.
Deficiency:	Record the total length in feet of curb and gutter sections that do not allow for proper drainage due to upheaval, misalignment, broken, or severely cracked sections. In these reported sections, water may be allowed to drain behind the curb or underneath the roadway.
Total:	Report the total length in feet of curb and gutter along each route or route segment. Include curb and gutter along both shoulders, but not along raised islands.
Comments:	Moderate spalling or flaking is not necessarily deficient. This evaluation does not include conditions relating to the sweeping of curb and gutter.

Examples:

Desired Condition
(Curb intact and functioning properly).



Deficient Condition
(Curb is broken).



Group 4 - Roadside Maintenance

4A1 - Litter Pickup

Description:	From the edge of pavement, this is an assessment of the density of visible roadside litter. Litter includes illegal signs, dead animals, tires, filters, drink cans, etc.
Desired Condition:	Annual target established for statewide litter
Deficient Condition:	Below the target established for statewide litter.

Reporting Guidelines:

Frequency:	At least semiannual. In addition to regular semiannual measures, be sure to update the condition whenever litter pickup work is done.
Measurement Area:	A station supervisor selects a representative 1/10 th mile section per MMQA section where UDOT is responsible for litter pickup. Measure one side of the roadway only, and only within the right-of-way. For consistency and the ability to track trends, designate each litter area and measure the same areas for a period of at least two fiscal years.
Visible Litter:	Observe the density of litter that is visible from the pavement edge, and make an assessment using a matrix condition 1 thru 5. The rating should be based on the visual appearance of the measurement area, not on a count of litter pieces. However, for reference purposes an actual count may be made to confirm the condition.

Examples:

Condition 1 "Grade A"
Clean condition. Little or no visible litter.
(approx. 0 to 50 count of litter)



Condition 2 "Grade B"
Generally clean condition. Small amount of visible litter.
(approx. 51 to 100 count of litter)



Condition 3 "Grade C"
Somewhat messy condition.
Moderate amount of visible
litter.
(approx. 101 to 150 counts of
litter)



Condition 4 "Grade D"
Moderately messy condition.
High amount of visible litter.
(approx. 151 to 200 counts of
litter)



Condition 5 "Grade F"
Very messy condition. Very
high amount of visible litter.
(greater than 201 counts of
litter)



4A2 - Fence Maintenance

Description:	An assessment of the condition of Access Control type fences maintained by UDOT. (Not all fences along UDOT rights-of-way are maintained by UDOT). UDOT Fence may be classified as either Access Control or Right of Way Delineation. <u>Access Control type fence</u> includes fences along all interstates, and all others that control pedestrian, livestock and/or wildlife for access control and safety. <u>Right of Way Delineation fence</u> establishes the approximate right of way line, but in most cases it does not serve a safety related function; therefore it is not included in the MMQA counts, although some level of maintenance is still necessary, at the discretion of the Region.
Desired Condition:	Fence is continuous and all components including gates are functioning as intended. Fence is an appropriate height based on installation intent. Fence is firmly attached to posts. Wires and stays are intact. Repairs are neat, of like materials, and secure. Posts are solid.
Deficient Condition:	Fence is silted in. Clips or staples are excessively loose or missing. Posts are bent or missing. Brace posts are bent, missing, or unattached. Wire is cut, loose or broken. Originally installed fence stays are missing. Gates are not functional or missing.

Reporting Guidelines:

Frequency:	Semiannual
Measurement Area:	All UDOT- "Access Control fence" including fences along interstate highways, and all other pedestrian, livestock and/or wildlife type installations.
Deficiency:	Report the length of deficient fence, from post to post. Example: if a wire is broken in a field fence, and the space between the two posts is 16 feet, the deficient measurement should be 16 feet.
Total:	Report the total length of UDOT-Access Control type fence.

Examples (*all examples assume the fence is for Access Control*):

Desired Condition
(*Fence is intact and functioning properly*).



Deficient Condition (*Fence is sagging significantly.*)



Deficient Condition
(*Fence is broken between posts, top cable is no longer intact.*)



Deficient Condition
(*Posts are leaning, clips are missing. Wire is not taut.*)



Deficient Condition
(*Post is bent*).



Desired Condition
(*Functional gate- access control*).



Desired Condition
(*Access control - livestock*).



Desired Condition
(Access control - deer).



Example of Right-of-Way Delineation Fence



Group 5 - Vegetation Control

5A1 - Weed Control

Description:	A measure of the presence of noxious weeds as defined by the State of Utah and select nuisance weeds.
Desired Condition:	No Utah State listed noxious weed within the measurement area. No listed nuisance weeds of concern within the designated spraying area, (see comments).
Deficient Condition:	Utah State listed noxious weeds or listed nuisance weeds are present.

Reporting Guidelines:

Frequency:	Semiannual
Measurement Area:	1/10 th mile sections, one or both sides of the roadway only as preferred. Measure only within the right-of-way. (If the right-of-way is unmarked, measure to 50 feet from the pavement edge). The station supervisor selects ten representative sections within the station boundaries.
Deficiency:	Report in square feet, (usually length times width), the area infested with noxious weeds and/or nuisance weeds of concern, as listed in Appendix A.
Total:	Report in square feet the total area evaluated in the 1/10 mile measurement area, (usually length times width). The following table may help:

Width	Total Area 1/10 th mile, 1 direction	Total Area 1/10 th mile, 2 directions, same width either side
20	10560	21120
25	13200	26400
30	15840	31680
35	18480	36960
40	21120	42240
45	23760	47520
50	26400	52800

Comments:	<p>If a particular nuisance weed is not one that UDOT intends to control, it should not be measured nor marked as present on the report. These decisions should be made in conjunction with the Roadside Vegetation Manager.</p> <p>The inspector should carry the Noxious Weed Field Guide for Utah to assist in weed identification. For consistency and the ability to track trends, designate each area and measure the same areas for a period of at least two fiscal years.</p>
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Examples:

Desired Condition

(No weeds present within right-of-way).



Deficient Condition

(Entire right-of-way infested with weeds).



Deficient Condition

(Most of right-of-way infested with weeds).



Deficient Condition

(Weeds present along right-of-way).



For weed identification, additional pictures are available on the web site of the Utah Weed Control Association at <http://www.utahweed.org/weeds.htm>.

5A2 – Control of Vegetation Obstruction

Description:	A measure of the presence of vegetation (generally tree limbs and bushes) obstructing signs.
Desired Condition:	Signs are clearly visible and unobstructed by vegetation.
Deficient Condition:	Tree limbs, brush, other vegetation, or other manmade objects obstruct a clear view of signs. Obstructed regulatory, school zone and warning signs should be scheduled for service as soon as possible.

Reporting Guidelines:

Frequency:	Semiannual
Measurement Area:	All UDOT-maintained roadways / roadsides.
Deficiency:	Report the number of separate obstructions along the route.
Total:	Report the total number of signs.
Comments:	Vegetation may also obstruct sight distance at intersections, or cause other safety issues. These issues should be handled as they arise, even though the MMQA count may not include them. Features obscured by grasses and vegetation that should be controlled by mowing are not considered in the deficiency count.

Examples:

Desired Condition
(Signs and appurtenances
are not obstructed by
vegetation).



Deficient Condition
(The speed limit sign is
obstructed by the spruce
tree).



Deficient Condition
(Both the arrow sign and
the R/R sign are
obstructed, though the
limbs in front of the R/R
sign may be difficult to see
in this photograph).



Group 6 - Drainage & Slope Repair

6A1 - Grade & Clean Ditches

Description:	A measure of the condition of UDOT-maintained ditches and channels.
Desired Condition:	Ditches flow freely.
Deficient Condition:	Ditches obstructed with silt, rock, or vegetation in such a way that the necessary capacity of the channel is compromised.

Reporting Guidelines:

Frequency:	Semiannual
Measurement Area:	All UDOT-maintained cut ditches, drainage ditches, and other channels for highway drainage.
Deficiency:	Report the deficient length, in feet, of the obstructed ditches or channels.
Total:	Report the total length of UDOT-maintained ditches or channels for proper drainage on the route or route segment.

Examples:

Desired Condition
(*Cut ditch is unobstructed*).



Desired Condition
*(Channel is open and
free-flowing).*



Deficient Condition
(Channel obstructed).



6A2 - Maintain Inlets/Outlets

Description:	A measure of the open condition of UDOT-maintained inlets, outlets, drop-inlets on drains, and cleanout boxes.
Desired Condition:	No flow restriction is greater than 25%.
Deficient Condition:	Pipes are filled more than 25%, as observed at the inlets, outlets, or drainage boxes.

Reporting Guidelines:

Frequency:	Semiannual
Measurement Area:	All UDOT-maintained inlets, outlets, drop inlets on drains and cleanout boxes along all routes.
Deficiency:	Report the deficient number of inlets, outlets, catch basins, or cleanout boxes, or where the pipes are filled or otherwise restricted more than 25%.
Total:	Report the total number of inlets, outlets, drop inlets, or catch basins.
Comments:	Each inlet, outlet, cleanout box, or drop inlet shall be counted as one, even if it includes the intersection of multiple pipes.

This measure does not assess the structural condition of the culvert, only the level of obstruction that can be cleaned out. However, the inspection is the ideal time to note and document other needs or problems beyond the scope of routine maintenance. These other needs can be noted in the comments box of the online inspection, but should also be noted for discussion with appropriate managers.

Examples:

Desired Condition
(Less than 25% Obstruction)



Deficient Condition
*(Restrictions can be on top of the
grate, or underneath the grate).*



Deficient Condition
(Inlet obstructed more than 25%)



6B1 - Erosion Repair

Description:	A measure of significant erosion on highway shoulders due to runoff.
Desired Condition:	No erosion channels on the shoulder are greater than one inch wide.
Deficient Condition:	Erosion channels on the shoulder are greater than one inch wide.

Reporting Guidelines:

Frequency:	Semiannual
Measurement Area:	All UDOT-maintained roadway shoulders, including medians on divided highways. Cut slopes that are beyond the cut ditch are not measured, but eroded drainage ditches within the right-of-way are measured.
Deficiency:	Report as deficient the measured length parallel to the highway or shoulder where erosion channels with widths greater than one inch are present. The measurement is usually taken along the shoulder guideline. For reporting purposes of isolated erosion problems, each occurrence of erosion channels should be recorded as a minimum of 10ft.
Total:	Report the total length of roadway edge within the reporting section, i.e. a standard divided interstate section with a depressed median would have a total equal to four times the length of the section.
Comments:	This is a safety-sensitive activity and as such, resources should be managed to mitigate any safety concerns.

Examples:

Desired Condition
(No erosion channels).



Deficient Condition
(Erosion rills greater than one inch wide).



Deficient Condition
(Eroded drainage ditch).



Deficient Condition
(Erosion rills greater than one inch wide.
Count as a minimum of 10 feet).



Deficient Condition

(Erosion channel greater than one inch wide. Count as a minimum of 10 feet).



Deficient Condition

(Erosion rills greater than one inch wide. Count as a minimum of 10 feet).



Group 8 - Traffic Services

8A1 - Pavement Striping Retroreflectivity

Description:	<p>A quantitative measure of the retroreflectivity of longitudinal pavement markings on UDOT routes, including:</p> <ul style="list-style-type: none">- White dashed lines dividing lanes traveling in the same direction on highways, and- White solid lines indicating the edge of highways. <p>Measurements will be taken with a mobile retroreflectometer employing 30 meter geometry according to the manufacturer's recommendations and "Mobile Retroreflectivity Best Practices Handbook", Rpt. No. FHWA/TX-09/0-5656-P1.</p>
Reporting Guidelines:	
Frequency:	Semiannual (in April and again in October)
Measurement Area:	<p>A sample size representing 4 percent of the total centerline miles in each paint crew area and in each Maintenance Management Level will be randomly generated by Maintenance Planning. The sample will be comprised of randomly generated route segments. All roads on the state system, regardless of level, will have an equal chance of being selected. For each segment on a multi-lane road, the outside skip (dashed) line will be measured in both directions. For each segment on a single lane road, the shoulder line will be measured in both directions. (<i>per "Optimization of Retro-Reflectivity Measurements", Michigan DOT, May. 2004</i>)</p>

8A2 - Pavement Messages

Description:	A subjective measure of the observed condition of all pavement messages on UDOT highways including word messages, crosswalks, stop bars, turn arrows painted/taped medians, islands, gore markings, etc.
Desired Condition:	Pavement messages have visible beads. Messages are free from chipping, fading, or wear. Messages are retroreflective and are not covered by crack sealing, patches or overlays. The entire message is visible and has uniform color.
Deficient Condition:	Pavement messages do not have visible beads. Chipping, fading, or wear is observed. Messages may be covered by crack sealing, patches or overlays.

Reporting Guidelines:

Frequency:	Semiannual
Measurement Area:	All messages on UDOT-maintained roadways.
Deficiency:	<p>Report the count of messages where pavement messages do not have visible beads or other markings lack retroreflectivity. Also count messages where chipping, fading, or wear is observed. Include the count of messages obscured by crack sealing, patches or overlays.</p> <p>The deficient count should include what should logically be replaced to restore the message to proper order, i.e. if a painted "STOP" is missing the S, the entire STOP will most likely be replaced and should be reported accordingly.</p>
Total:	Report the total count of messages for each segment of every route on UDOT highways.
Comments:	<p>For counting purposes, record each of the following as one message: each letter, each arrow, each arrowhead on a multiheaded arrow, and each 2' x 10' bar on a high visibility crosswalk</p> <p>For a standard crosswalk, record two messages per lane and two per shoulder or median.</p> <p>For a stop bar, include one message per lane and one per shoulder.</p> <p>For median / gore area hatching, include one message per hatch line.</p> <p>For railroad crossings, record one message for each R, for each line on the X, one for each transverse bar, and one for the stop bar.</p> <p>For cattle guards, record one message per line per lane.</p>

Examples:

Desired Condition

(Crosswalk lines, stop bars, and hatch marks are clearly visible).



Deficient Condition

(Some of the crosswalk bars are worn excessively. Count as deficient all of the bars that would logically be replaced at the time the worn bars are replaced).



8A3 - Repair & Replace Signs

Description:	A measure of the condition of sign installations along UDOT highways.
Desired Condition:	Sign faces are readable and retroreflective; sign post is plumb and unbroken. All sign hardware is in place.
Deficient Condition:	Signs are no longer readable, are leaning, have a sign face rotated away from traffic or misaligned, missing sign faces or hardware, or are otherwise broken.

Reporting Guidelines:

Frequency:	Semiannual
Measurement Area:	All UDOT-maintained roadways / roadsides.
Deficiency:	<p>Record the number of sign installations that do not meet the standard. A sign installation is either a single sign post with one or more sign faces mounted on it, or a sign face (or faces) supported by multiple posts. See the pictures for examples, and for an illustration of the one exception to this rule.</p> <p>Signs are classified as deficient for insufficient retroreflectivity, worn or missing characters in message, missing hardware, rotated or misaligned faces, broken posts, or when post(s) are out of plumb more than ½ inch per foot of post height. (A single deficient sign face will cause the entire installation to be deficient). Illegal signs should be removed and are not counted as part of our measure.</p>
Total:	Record the total number of sign installations for each route or route segment.
Comments:	According to UDOT's Sign Management System Policy 06C-21, it will be necessary to occasionally do a night-time inspection to monitor and accurately record deficiencies due to reflectivity of sign faces.

Examples:

Desired Condition (4 installations)

Deficient Condition (1 installation)

(The array of chevrons counts as one installation, and is the one exception to the definition of a sign installation. MUTCD specifies the spacing of the chevron panels, so the group acts as a single sign mounted on 4 posts.)

The other 4 signs each stand alone. The US-50 East sign is leaning, and therefore deficient. The other 4 installations are in acceptable condition).



Count as one installation

Desired Condition

(2 of 2 signs in acceptable condition. Minor damage on arrow sign does not significantly impact the message. The sticker on the crash cushion is indeed faded and needs attention, but that is part of the crash cushion and is not counted as a sign).



Desired Condition

(The post and all four sign faces are in acceptable condition. Counts as one installation.)



Desired condition (six installations)

(Each of the five chevron panels is its own installation. The green and blue directional sign in the background is also a single installation, because all three faces are attached to the same pair of posts.)



Deficient Condition

(1 of 2 sign faces has been significantly defaced, rendering the installation deficient, i.e. record 1 deficient installation).



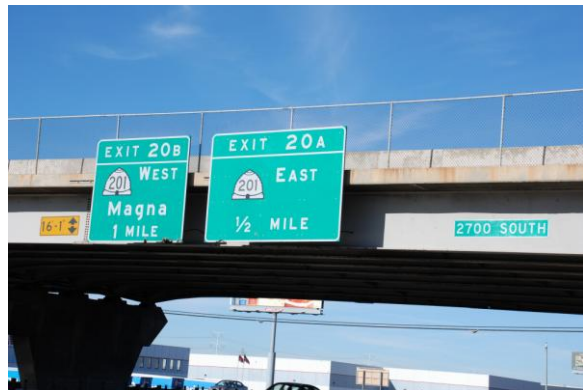
Deficient Condition
(The post is leaning, affecting one sign installation)



Desired Condition
(The posts and all four sign faces are in acceptable condition. Counts as one installation.)



Desired Condition
(All four sign faces are in acceptable condition. Counts as one installation because all the faces are attached to the same support.)



Deficient Condition (one of two installations).
(Counts as 2 installations. The installation on the right is deficient due to insufficient retroreflectivity on the arrow sign. This is a sample of difference in visibility between daytime and nighttime conditions.)



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8A4 - Repair and Replace Delineators

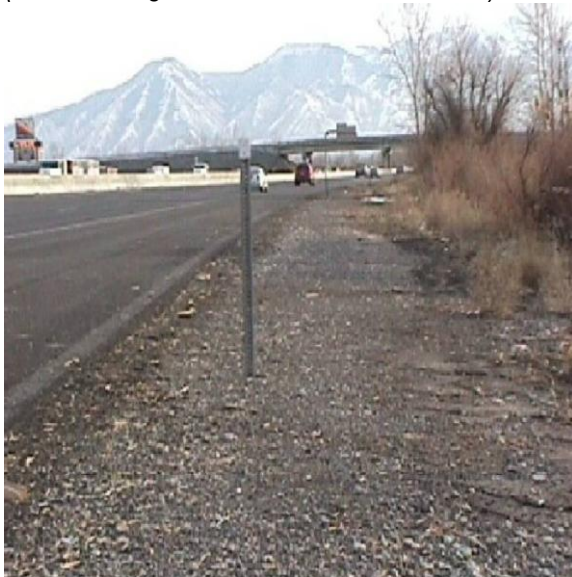
Description:	A measure of the condition of reflective roadside post-mounted, guardrail-mounted, and barrier-mounted roadside delineation placed for guidance. It also includes markers placed on structure parapets for the same purpose.
Desired Condition:	Delineators have 75% of the retro-reflective tape/button visible and posts are not out of plumb more than $\frac{1}{2}$ " per foot of height.
Deficient Condition:	Delineators have less than 75% of the retro-reflective tape/button visible and/or posts are out of plumb more than $\frac{1}{2}$ " per foot of height.

Reporting Guidelines:

Frequency:	Semiannual
Measurement Area:	All UDOT-maintained roadways / roadsides.
Deficiency:	Deficient delineators are defined as delineation which is missing more than 25% of the reflective tape/button, out of plumb more than $\frac{1}{2}$ " per foot of height. Delineators buried by snow where a snow pole is not visible are counted as deficient.
Total:	Record the total number of post-mounted, guardrail- or barrier-mounted and parapet-mounted delineation markers along the entire route or route segment.
Comments:	Delineators placed in accordance with an older standard for spacing and/or orientation, are not counted as deficient for those conditions alone. Reflective tabs mounted on cable barrier systems are not counted as delineators. (See example.) Linear Delineation System (LDS) panels placed on concrete barrier are not counted as delineators, but are evaluated as part of barrier maintenance. (See example.)

Examples:

Desired Condition
(Post is straight, reflective marker is intact).



Deficient Condition
(Post is bent).



Desired Condition
(Reflectors on guardrails are in acceptable condition).



Deficient Condition
(The reflector is missing).



Desired Condition
(Reflectors on guardrails are in acceptable condition).



Deficient Condition
(Posts are leaning, some are missing reflectors).



(Reflective tabs mounted on cable barrier systems are not counted as delineators.)



(Linear Delineation System is not counted as delineation, but part of barrier maintenance).



8A5 - Guardrail Maintenance

Description:	A measure of the condition of guardrail, concrete barrier, and cable barrier on state routes.
Desired Condition:	Panels are undamaged, and all posts, offset blocks, panels and connection hardware are in place.
Deficient Condition:	Panels may be damaged, posts may be leaning, bent, or broken. Offset blocks, panels and connection hardware may be missing. Guardrail sections or cable runs may be sagging.

Reporting Guidelines:

Frequency:	Semiannual
Measurement Area:	All UDOT-maintained roadways / roadsides.
Deficiency:	<p>Report the length in feet of guardrail or barrier that needs to be replaced or repaired due to damaged panels, missing hardware, or leaning, bent, or broken posts. Also report sections where the guardrail or cables are sagging or improperly tensioned. For concrete barrier, missing or damaged connections or breakage that creates a snag hazard should be counted deficient.</p> <p>Deficient measurements should include the length of the pieces that will need to be replaced, though only a portion may be deficient.</p>
Total:	Report the entire length in feet of barrier, guardrail, and cable barrier along the route. It is not necessary to distinguish between different types of roadside barrier or guardrail.
Comments:	While sagging guardrail would be measured as deficient, guardrail that no longer meets current standards for height due to changes in standards or due to overlays would not be counted as deficient. These specific deficiencies must be addressed outside the scope of normal maintenance work and station budgets.

Examples:

Desired Condition
(Height may be low).



Deficient Condition
(Blocks missing, hardware not intact).



Desired Condition
(Posts intact, properly tensioned).



Deficient Condition
(Post damaged).



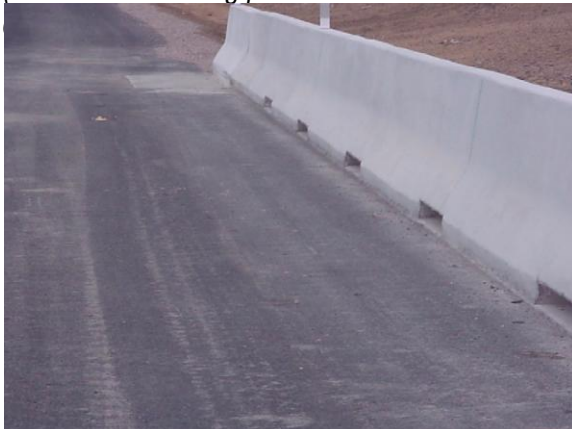
Deficient Condition
(Rail is bent).



Deficient Condition
(Deficiency due to damage, not due to obsolete installation).



Desired Condition
(Barrier has no snag points and unseen



Deficient Condition
(Barrier has been knocked out of alignment).



8A8 – Sweeping

Description:	A measure of the accumulations of material along sweeping areas. Roadways with unpaved shoulders, or no barriers, are often not swept on a regular basis, and only included on a case by case basis.
Desired Condition:	Sweeping areas, as defined below, have less than 3/8 inch dirt, sand, silt and/or debris, in any continuous 10 foot segment.
Deficient Condition:	Accumulations exceed 3/8-inch for greater than ten continuous feet on a paved surface, or when smaller accumulations affect the proper drainage or pavement markings of the roadway.

Reporting Guidelines:

Frequency:	Semiannual
Measurement Area:	<p>Sweeping areas are those areas of hard surface that have an adjacent physical barrier that often retains dirt, sand, silt or debris. Sweeping areas often present safety and drainage related issues if not well maintained.</p> <p>Examples of sweeping areas include those bounded by physical barriers, such as curb and gutter, median barrier, raised traffic islands, parapet walls, structures, guardrail and other obstacles. Sweeping areas may also include other areas that periodically need sweeping, such as entrances to gravel pits or landfills as well as some bike lanes.</p>
Deficiency:	Report the total length of sweeping area where the accumulations of dirt, sand, silt or debris, are greater than 3/8-inch deep for more than 10 continuous feet.
Total:	Report the length of highway edges, medians, and island edges that may require sweeping within the reporting section. Use the diagrams in this section to determine the total length of sweeping areas for sections with multiple barriers (e.g. curb and gutter on both sides would be twice the length).
Comments:	Spot sweeping is often needed, but not included in the sweeping area count. Examples may include accidents, spills and other unplanned situations.

Examples:

Desired Condition

(Less than 3/8 inch of dirt or sand)



Deficient Condition

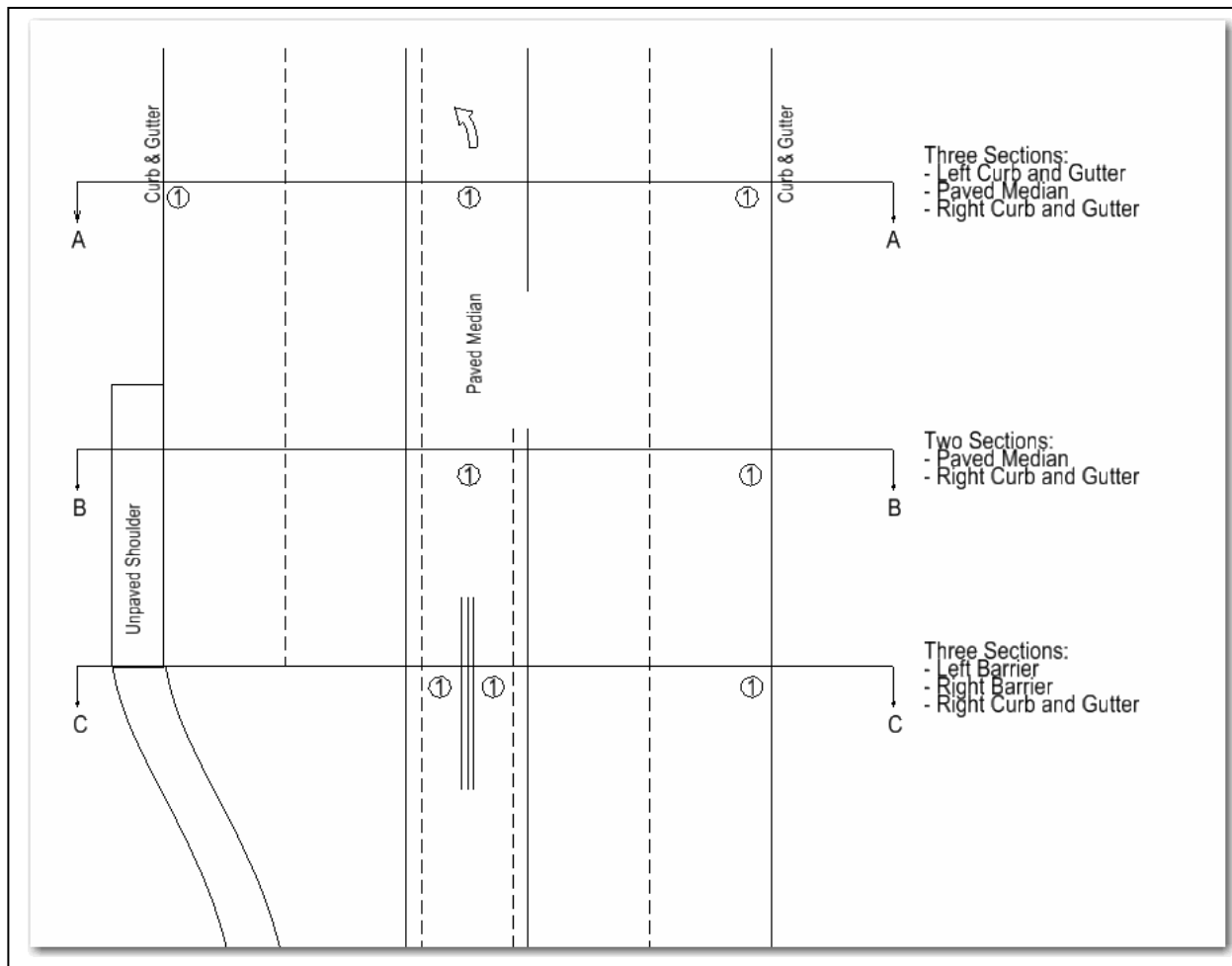
(More than 3/8 inch of dirt)



Desired Condition
(Less than 3/8 inch of dirt or sand)



Deficient Condition
(Obscured Paint Lines)



Example of Sweeping Area Counts

Group 10 - Rest Area Maintenance

10A1 – Rest Area Maintenance

Description:	A measure of the condition of rest areas.
Desired Condition:	<p>Restrooms are clean and fresh. No visible graffiti or trash. Soap and paper supplies are adequate and all trash is contained within trash cans.</p> <p>Buildings are mostly in good repair. Essential elements such as partitions, doors, dispensers, and hand dryers are in place and functioning.</p> <p>Landscape planting is healthy & free of weeds. Lawns have been mowed in the previous week. Sidewalks, picnic areas & site areas are clean & free of litter. All lighting is functioning.</p>
Deficient Condition:	Conditions are poorly maintained and facilities are in need of repair.

Reporting Guidelines:

Frequency:	Monthly
Measurement Area:	All UDOT-maintained and contractor-maintained rest areas.
Score:	For each rest area, record the condition, 1-5, as described below, for each of the following categories: site, janitorial, building, and operations.

Condition Descriptions:

Condition 1

Janitorial Services: Rest rooms are clean. Room smells fresh. No graffiti or litter is visible. Soap & paper supplies are adequate. Trash is fully contained in trash cans.

Building & Utilities: Building in mostly good repair; i.e., some minor repairs (under ~\$500) remaining, but none affecting essential elements. All partitions, doors, dispensers & hand dryers are in place and functioning. All mechanical & electrical systems are fully operational.

Site: Landscape planting healthy & free of weeds. Lawns mowed in the previous week. Sidewalks, picnic areas & site areas clean & free of litter. All site lighting functioning. Trash is fully contained in receptacles. Facilities are in good repair; i.e., no minor repairs remaining affecting the function of the facility.

Operations: Rest area is open 24 hours a day, with no closures. Attendant is on site 100% of the contract time.

Condition 2

Janitorial Services: Rest rooms are mostly clean and may have a slight undesirable odor. Minor amount of graffiti &/or litter is visible. Soap & paper supplies are mostly adequate. Trash is fully contained in trash cans.

Building & Utilities: Building in average repair; i.e., several minor repairs remaining, but none significantly affecting the essential elements. One partition, door, dispenser or hand dryer missing, not functioning or with a temporary replacement. Minor mechanical &/or electrical system malfunctions.

Site: Landscape planting healthy with a few weeds. Lawns mowed in the previous week. Sidewalks, picnic areas & site areas mostly clean with some litter. Most site lighting functioning. Trash is fully contained in receptacles. Facilities are in mostly good repair; i.e., some minor repairs remaining.

Operations: Rest area is open 24 hours a day & attendant is on site 95% of the contract time.

Condition 3

Janitorial Services: Rest rooms are acceptably clean. Slight undesirable odor is present. A minor amount of graffiti &/or litter visible. Soap & paper supplies about half used. Trash is contained in trash cans.

Building & Utilities: Building in poor repair; i.e., many minor repairs remaining. More than one partition, door, dispenser or hand dryer missing, not functioning or with a temporary replacement. Major mechanical &/or electrical system malfunctions.

Site: Landscape planting exhibits some stress with moderate weeds. Some trees damaged or with dying branches. Lawns not mowed in the previous week. Sidewalks, picnic areas & site areas average clean with moderate amounts of litter. Significant amount of site lighting is not functioning. Trash is contained in receptacles. Facilities are in average repair; i.e., several minor repairs remaining.

Operations: Rest area is open 24 hours a day & attendant is on site 90% of the contract time.

Condition 4

Janitorial Services: Rest rooms are noticeably dirty. Significant undesirable odor is present. A significant amount of graffiti &/or litter is visible. Soap & paper supplies nearing empty. Trash containers are approaching overflowing.

Building & Utilities: Building in poor repair; i.e., many minor repairs remaining. More than one partition, door, dispenser or hand dryer missing, not functioning or with a temporary replacement. Major mechanical &/or electrical system malfunctions.

Site: Landscape planting exhibits severe stress with noticeable weeds. Several trees damaged or with dying branches. Lawns not mowed in the previous week. Sidewalks, picnic areas & site areas noticeably dirty with significant amounts of litter. Significant amount of site lighting is not functioning. Trash containers are approaching overflowing. Facilities are in poor repair; i.e., many minor repairs remaining.

Operations: Rest area is open 24 hours a day & attendant is on site 85% of the time.

Condition 5

Janitorial Services: Rest rooms are extremely dirty. Noxious odors are present. Excessive graffiti &/or litter is visible. Soap & paper supplies are empty. Trash containers are full &/or overflowing.

Building & Utilities: Building in disrepair; i.e., numerous repairs remaining or building closed. All partitions, doors, dispensers or hand dryer missing, not functioning or with a temporary replacement. Major mechanical &/or electrical systems are failures.

Site: Landscape planting exhibits severe stress with significant weeds. Most trees damaged or with dying branches. Lawns dead. Sidewalks, picnic areas & site areas extremely dirty with excessive amounts of litter. Most site lighting is not functioning. Trash containers are full &/or overflowing. Facilities are in disrepair; i.e., numerous repairs needed.

Operations: During normal operating period, rest area is open 24 hours a day <85% of the contract time.

Condition 6

Rest Area Closed.

Appendix A

Utah Noxious Weed List

The following weeds are officially designated and published as noxious for the State of Utah, as per the authority vested in the Commissioner of Agriculture under Section 4-17-3, Utah Noxious Weed Act:

There are hereby designated three classes of noxious weeds in the state: Class A (EDRR) Class B (Control) and Class C (Containment).

Class A: Early Detection Rapid Response (EDRR) Declared noxious weeds not native to the state of Utah that pose a serious threat to the state and should be considered as a very high priority.

- Black henbane - *Hyoscyamus niger* (L.)
- Diffuse Knapweed - *Centaurea diffusa* (Lam.)
- Leafy Spurge - *Euphorbia esula* L.
- Medusahead - *Taeniatherum caput-medusae*
- Oxeye daisy - *Chrysanthemum leucanthemum* L.
- Perennial Sorghum spp. - including but not limited to Johnson Grass (*Sorghum halepense* (L.) Pers.) and Sorghum Almum (*Sorghum Almum*, Parodi).
- Purple Loosestrife - *Lythrum salicaria* L.
- Spotted Knapweed - *Centaurea maculosa* Lam.
- St. Johnswort - *Hypericum perforatum* L.
- Sulfur cinquefoil - *Potentilla recta* L.
- Yellow Starthistle - *Centaurea solstitialis* L.
- Yellow Toadflax - *Linaria vulgaris* Mill.

Class B: (Control) Declared noxious weeds not native to the state of Utah that pose a threat to the state and should be considered a high priority for control.

- Bermudagrass* - *Cynodon dactylon* (L.) Pers.
- Broad-leaved Peppergrass - *Lepidium latifolium* L. (Tall Whitetop)
- Dalmation Toadflax - *Linaria dalmatica* (L.) Mill
- Dyers Woad - *Isatis tinctoria* L.
- Hoary cress - *Cardaria* spp.
- Musk Thistle - *Carduus nutans* L.
- Poison Hemlock - *Conium maculatum* L.
- Russian Knapweed - *Centaurea repens* L.
- Scotch Thistle - *Onopordium acanthium* L. (Cotton Thistle)

- Squarrose Knapweed - *Centaurea virgata* Lam. Ssp *Squarrosa*

Class C: (Containment) Declared noxious weeds not native to the state of Utah that are widely spread but pose a threat to the agricultural industry and agricultural products with a focus on stopping expansion.

- Field Bindweed - *Convolvulus* spp. (Wild Morning-glory)
- Canada Thistle - *Cirsium arvense* (L.) Scop.
- Hound's tongue - *Cynoglossum officinale* L.
- Saltcedar - *Tamarix ramosissima* Ledeb.
- Quackgrass - *Agropyron repens* (L.) Beauv.

* Bermudagrass (*Cynodon dactylon*) shall not be a noxious weed in Washington County and shall not be subject to provisions of the Utah Noxious Weed Law within the boundaries of that county. It shall be a noxious weed throughout all other areas of the State of Utah and shall be subject to the laws therein.

Nuisance Weed List

- Cheat grass
- Common sunflower
- Common ragweed
- Curly gumweed
- Jointed goat grass
- Kocia
- Prickly lettuce
- Rabbit brush
- Russian thistle
- Tall sweet clover

For weed identification, additional pictures are available on the web site of the Utah Weed Control Association at <http://www.utahweed.org/weeds.htm>.

Appendix B

Grade Calculations

Measures Graded as a Percentage of Deficient Features to Total Features – Safety Category A

These measures relate to safety sensitive activities, and are therefore rated on a stricter scale than the Safety Category B activities. These include:

3A1	Shoulder Work	8A3	Repair and Replace Signs
8A4	Repair and Replace Delineation	5A2	Vegetation Obstruction

The grading scale for these items is as follows:

Percent Deficient	Grade	Percent Deficient	Grade
0.00 – 1.71	A+	13.41 – 14.99	C-
1.72 – 3.41	A	15.00 – 16.69	D+
3.42 – 5.00	A-	16.70 – 18.39	D
5.01 – 6.70	B+	18.40 – 19.99	D-
6.71 – 8.40	B	20.00 – 21.69	F+
8.41 – 10.00	B-	21.70 – 23.39	F
10.01 – 11.70	C+	23.40 – 100.00	F-
11.71 – 13.40	C		

Measures Graded as a Percentage of Deficient Features to Total Features – Safety Category B

Safety Category B activities are rated such that a grade in the “A” range equates to 90-100% of features in acceptable condition, a grade in the “B” range equates to 80-90% acceptable, etc. These include:

3A2	Curb and Gutter	6B1	Erosion Repair
4A2	Fence Maintenance	8A2	Pavement Messages
5A1	Weed Control	8A5	Guardrail Maintenance
6A1	Grade and Clean Ditches	8A8	Sweeping
6A2	Maintain Inlets		

The grading scale for these items is as follows:

Percent Deficient	Grade	Percent Deficient	Grade
0.00 – 3.43	A+	26.82 – 30.00	C-
3.44 – 6.83	A	30.01 – 33.40	D+
6.84 – 10.02	A-	33.41 – 36.79	D
10.03 – 13.42	B+	36.80 – 39.99	D-
13.43 – 16.82	B	40.00 – 43.39	F+
16.83 – 20.01	B-	43.40 – 46.78	F
20.02 – 23.41	C+	46.79 – 100.00	F-
23.42 – 26.81	C		

Measures Graded as a Reported Condition

A few measures are reported as a condition, numbers 1 through 5. These include:

1A1	Snow and Ice	10A1	Rest Area
4A1	Litter		

Conditions 1 through 5 correspond to grades A through F, respectively. When combined, the average resulting condition corresponds to letter grades as follows:

Condition	Grade	Condition	Grade
1.00 – 1.33	A+	3.68 – 3.99	C-
1.34 – 1.67	A	4.00 -- 4.33	D+
1.68 – 1.99	A-	4.34 -- 4.67	D
2.00 -- 2.33	B+	4.68 -- 4.99	D-
2.34 -- 2.67	B	5.00	F+
2.68 -- 2.99	B-		
3.00 -- 3.33	C+		
3.34 -- 3.67	C		

Pavement Striping Retroreflectivity Measures

Group 8A1 Pavement Striping Retroreflectivity grade calculations are unique and calculated based on the average measured retroreflectivity for the set of measured segments in a paint crew area and Maintenance Management Level. The corresponding grades are as follows:

Measured Retroreflectivity	Grade	Measured Retroreflectivity	Grade
300 or more	A+	90 - 99	C-
250 - 299	A	80 - 89	D+
225 - 249	A-	75 - 79	D
200 - 224	B+	70 - 74	D-
175 - 199	B	65 - 69	F+
150 - 174	B-	60 - 64	F
125 - 150	C+	Less than 60	F-
100 - 124	C		